IN THE CLAIMS:

The following listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A method comprising:

(a) assembling a set of models that represent components of a value chain, wherein each of the models of said set includes one or more variables, where each of said one or more variables is defined on a corresponding range, wherein at least one of the models of said set of models is a geocellular reservoir model;

(b) selecting values of the variables in their respective ranges to create instantiated models;

(c) assembling the instantiated models into a workflow;

(d) executing one or more simulation engines on the workflow to generate data output; and

(e) storing the selected values of the variables and the data output from the one or more simulation engines to a memory;

wherein at least one of the one or more simulations engines is a physics-based reservoir flow simulator.

2. (Cancelled)

3. (Original) The method of claim 1 further comprising:

repeating (b), (c) and (d).

4. (Original) The method of claim 3, wherein said repeating covers all possible combinations of values of the variables in their respective ranges.

5. (Original) The method of claim 3, wherein said repeating achieves a sensitivity analysis by scanning each variable through the corresponding range, one at a time, while maintaining all other variables at nominal values.

6. (Original) The method of claim 3, wherein said repeating uses an experimental design algorithm to generate combinations of variable values in each iteration of said repeating of (b), (c) and (d).

7. (Original) The method of claim 1, wherein said selecting of values of the variables includes computing quantiles of one or more user-specified probability distributions.

8. (Original) The method of claim 1, wherein said selecting of values of the variables is based on a Latin Hypercube sampling of the variables.

9. (Original) The method of claim 1, wherein said selecting of values of the variables includes choosing a value in a user-specified quantile range $[Q_A, Q_B]$ based on a probability distribution specified by a user for a first one of the variables, wherein A and B are integers between zero and 100 inclusive.

10. (Currently Amended) A method comprising:

(a) assembling a set of models that represent components of a value chain, wherein each of the models of said set includes one or more random variables, wherein at least one of the models of the set of models is a geocellular reservoir model;

(b) instantiating the random variables of each model to determine instantiated models;

(c) assembling the instantiated models into a workflow;

(d) executing one or more simulation engines on the workflow to generate data output; and

(e) storing the data output from the one or more simulation engines to a memory;

wherein at least one of the one or more simulation engines is a physics-based reservoir flow simulator.

11. (Cancelled)

12. (Original) The method of claim 10 further comprising:

repeating (b), (c) and (d).

13. (Currently Amended) A method comprising:

(a) computing an instantiated value of a random variable;

(b) selecting a first model from a collection of models based on the instantiated value, wherein the collection of models are geocellular reservoir models;

(c) executing a simulation engine on an input data set including the first model; and

(d) capturing data generated by the simulation engine in response to said execution to a storage medium;

wherein the simulation engine includes a physics-based reservoir flow simulator.

14. (Cancelled)

15. (Previously Presented) The method of claim 13 wherein the simulation engine also includes an economic computation engine.

16. (Currently Amended) The method of claim 13, wherein the input data set also includes one or more of: ~~first model is any one of a reservoir model,~~ a model of reservoir physical characteristics, a well location model, a well plan model, a well drilling schedule model, a well production schedule model, a capital investment expense model, an operating expense model, [[or]] and a fiscal regime model.

17. (Currently Amended) A system comprising:

a memory configured to store program instructions and data;

a processor configured to read the program instructions from the memory, wherein, in response to execution of the program instructions, the processor is operable to:

(a) assemble a set of models, wherein each of the models of said set includes one or more variables, where each of said one or more variables is defined on a corresponding range, wherein at least of the models of said set is a geocellular reservoir model;

(b) select values of the variables in their respective ranges to create instantiated models;

(c) assemble the instantiated models into a workflow; and

(d) execute one or more simulation engines on the workflow;

wherein at least one of the simulation engines is a physics-based reservoir flow simulator.

18. (Original) The system of claim 17, wherein, in response to execution of the program instructions, the process is further operable to:

(e) store data output from the one or more simulation engines to the memory.

19. (Currently Amended) A computer-readable memory medium configured to store program instructions, wherein the program instructions are configured to direct one or more computers to perform operations comprising:

(a) assembling a set of models, wherein each of the models of said set includes one or more variables, where each of said one or more variables varies in a corresponding range, wherein at least one of the models of said set is a geocellular reservoir model;

(b) selecting values of the variables in their respective ranges to create instantiated models;

(c) assembling the instantiated models into a workflow;

(d) executing one or more simulation engines on the workflow;

wherein at least one of the one or more simulation engines is a physics-based reservoir flow simulator.

20. (Original) The computer-readable memory medium of claim 19, wherein the program instructions are further configured to direct the one or more computers to implement the operation of:

(e) storing data output from the one or more simulation engines to a memory.

21. (Currently Amended) A method comprising:

performing setup operations to assemble a case comprising a set of planning variables and models, wherein at least one of said models is a geocellular reservoir model;

executing a calculation loop one or more times, wherein each iteration of the calculation loop comprises:

(a) generating instantiations of the planning variables to determine instantiated models from the models;

(b) executing one or more simulation engines on the instantiated models; and

(c) capturing the instantiated planning variables and output data from the one or more simulation engines onto a storage medium;

wherein at least one of the one or more simulation engines is a physics-based reservoir flow simulator.

22. (Cancelled)

23. (Previously Presented) The method of claim 21, wherein said capturing comprising storing the instantiated planning variables and simulation output data onto the storage medium in a relational database format.

24. (Original) The method of claim 21, wherein said generating instantiations of the planning variables includes:

calculating a set of random numbers;

calculating quantile values using the random numbers and user-defined probability distributions associated with the planning variables.

25. (Previously Presented) The method of claim 21, wherein the one or more simulation engines include an economic computation engine.

26. (Original) The method of claim 21, wherein the calculation loop further includes:

executing a well perforator prior to executing the one or more simulation engines.

27. (Original) The method of claim 21, wherein said performing setup operations includes receiving user input specifying execution qualifying data corresponding to the case.

28. (Original) The method of claim 27, wherein the execution qualifying data includes a number of iterations of the calculation loop.

29. (Original) The method of claim 27, wherein the execution qualifying data includes a set of attainable values for each planning variable.

30. (Original) The method of claim 27, wherein the execution qualifying data include data characterizing probability distributions for one or more of the planning variables.

31. (Original) A method comprising:

receiving user input to assemble a first case comprising models and planning variables;

receiving user input to assemble a second case based on the first case;

storing the first case, the second case and differences between the first case and second case in a memory medium;

displaying an indication of the first case, second case, and a parent child relationship between the first case and second case;

conditionally displaying the differences between the first case and second case in response to a user request.

32-41 (Cancelled)

42. (Previously Presented) A method comprising:

(a) receiving user input characterizing probability distributions for planning variables associated with a set of models, wherein the set of models includes one or more geocellular reservoir models;

(b) generating instantiated values of the planning variables;

(c) assembling one or more input data sets for one or more simulation engines from the set of models and the instantiated values;

(d) executing the one or more simulation engines on one or more input data sets; and

(e) storing the instantiated values of the planning variables and data output from the one or more simulation engines to a storage medium;

wherein the one or more simulation engines include a physics-based reservoir flow simulator.

43. (Cancelled)

44. (Currently Amended) The method of claim 42 further comprising: performing (b), (c), ~~and~~ (d) and (e) a number of times until a termination condition is achieved.

45. (Currently Amended) The method of claim 42 further comprising: executing a reservoir model scaling engine to scale said one or more geocellular reservoir models of said set of models to a lower resolution.

46. (Original) The method of claim 42 further comprising: executing a schedule resolver program which generates instantiated schedules based on a first subset of the set of models and a first subset of the instantiated values.

47. (Original) The method of claim 42 further comprising: executing a well perforator program based on a second subset of the set of models and a second subset of the instantiated values.

48. (Currently Amended) A method comprising:

(a) receiving user input characterizing a set of planning variables associated with a set of models;

(b) generating instantiated values of the planning variables;

(c) assembling a first input data set using a first subset of the instantiated values and a first subset of the set of models, and assembling a second input data set using a second subset of the instantiated values and a second subset of the set of models, wherein the first subset of the set of models includes a geocellular reservoir model;

(d) determining well perforation locations for wells in the first input data set, and appending the well perforation locations to the first input data set;

(e) determining instantiated schedules using a third subset of the instantiated values and a

third subset of the models, and appending the instantiated schedules to the first input data set and the second input data set;

(f) executing a reservoir flow simulator on the first input data set to generate flow data for oil, gas and water and appending the flow data to the second input data set;

(g) executing an economic computation engine on the second input data set to generate economic output data;

(h) storing the instantiated values of the planning variables, the flow data and the economic output data to a storage medium in a relational database format; and

(i) repeating (b), (c), (d), (e), (f), (g) and (h) until a termination condition is achieved.